ITT Technical Institute

TB184P

Problem Solving

Onsite and Online Course

SYLLABUS

Credit hours: 4

Contact/Instructional hours: 56 (56 Theory Hours)

Prerequisite(s) and/or Corequisite(s):

None.

Course Description:

This course introduces students to problem solving techniques and helps them apply the tools of critical reading, analytical thinking and mathematics to help solve problems in practical applications.

COURSE SUMMARY

COURSE DESCRIPTION

This course introduces students to problem solving techniques and helps them apply the tools of critical reading, analytical thinking and mathematics to help solve problems in practical applications.

MAJOR INSTRUCTIONAL AREAS

1. The general problem-solving process
2. Problem-solving theory and tools
3. Principles of critical reading, analytical thinking, and mathematical reasoning

COURSE LEARNING OBJECTIVES

By the end of this course, you should be able to:

1. Execute problem solving actions appropriate to completing a variety of case study assignments.
2. Apply critical reading to identify the meaning of information in a problem statement.
3. Apply analytical and logical thinking to extract facts from a problem description and determine how they relate to one another and to the problem(s) to be solved.
4. Apply mathematics as a problem solving tool.
5. Provide symbolic, verbal, and graphical interpretations of statements in a problem description.
6. Apply analytical tools for evaluating the causes and potential implications of a problem.
7. Generate potential solutions to a problem and determine the best course of action with regard to effectiveness, efficiency, and mitigation of risks.
8. Design methodology for implementing problem solution(s).
9. Develop tools for evaluating implementation of problem solution(s).
10. Use the ITT Tech Virtual Library to research selected topics related to problem solving.

COURSE OUTLINE

MODULE 1: PROBLEM IDENTIFICATION

COURSE LEARNING OBJECTIVES COVERED

- Apply critical reading to identify the meaning of information in a problem statement.
- Apply analytical and logical thinking to extract facts from a problem description and determine how they relate to one another and to the problem(s) to be solved.

TOPICS COVERED

- Problem-Solving Heuristic
- Analyzing Ill-Defined Problems

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Fogler & LeBlanc, Chapter 1, pp. 1–12	No	1.5 hr
Lesson: Study the lesson for this module.	No	1 hr
Analysis: Submit the analysis titled "Ill-Defined Problems."	Yes	2.5 hr
Project: Read and begin work on the project.	No	1 hr

Total Out-Of-Class Activities: 6 Hours

MODULE 2: SUCCESSFUL PROBLEM SOLVERS

COURSE LEARNING OBJECTIVES COVERED

- Execute problem solving actions appropriate to completing a variety of case study assignments.
- Apply mathematics as a problem solving tool.
- Provide symbolic, verbal, and graphical interpretations of statements in a problem description.

TOPICS COVERED

- Successful Career Actions
- Effective vs. Ineffective Problem Solvers
- Real Number Problems and Algebraic Equations

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Fogler & LeBlanc • Chapter 2, pp. 13–35 • Chapter 11, pp. 235–245	No	3.5 hr
Lesson: Study the lesson for this module.	No	2 hr
Discussion: Participate in the discussion titled "Successful Career Actions."	Yes	1 hr
Exercise 1: Submit the exercise titled "Characteristics of Effective and Ineffective Problem Solvers."	Yes	1.5 hr
Exercise 2: Submit the exercise titled "Problem Solving."	Yes	1.5 hr
Project: Continue to work on Project Part 1.	No	2 hr

Total Out-Of-Class Activities: 11.5 Hours

MODULE 3: DEFINING PROBLEMS

COURSE LEARNING OBJECTIVES COVERED

- Apply critical reading to identify the meaning of information in a problem statement.
- Apply analytical and logical thinking to extract facts from a problem description and determine how they relate to one another and to the problem(s) to be solved.
- Apply analytical tools for evaluating the causes and potential implications of a problem.

TOPICS COVERED

- Gathering Information on a Problem
- Problem-Definition Techniques
- Using Problem Definition Techniques

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Fogler & LeBlanc • Chapter 3, pp. 37–45 • Chapter 4, pp. 47–88	No	5 hr
Lesson: Study the lesson for this module.	No	2 hr
Discussion: Participate in the discussion titled "Problem Definition Techniques."	Yes	1 hr
Analysis 1: Submit the analysis titled "Gathering and Collecting Information."	Yes	2 hr
Analysis 2: Submit the analysis titled "The Importance of Accurate Problem Definition."	Yes	2 hr
Analysis 3: Submit the analysis titled "Using Problem Definition Techniques."	Yes	2 hr
Project: Continue to work on Project Part 1.	No	2 hr

Total Out-Of-Class Activities: 16 Hours

MODULE 4: PROBLEM SOLVING

COURSE LEARNING OBJECTIVES COVERED

- Execute problem solving actions appropriate to completing a variety of case study assignments.
- Apply analytical and logical thinking to extract facts from a problem description and determine how they relate to one another and to the problem(s) to be solved.
- Apply mathematics as a problem solving tool.
- Provide symbolic, verbal, and graphical interpretations of statements in a problem description.
- Apply analytical tools for evaluating the causes and potential implications of a problem.
- Design methodology for implementing problem solution(s).
- Develop tools for evaluating implementation of problem solution(s).
- Use the ITT Tech Virtual Library to research selected topics related to problem solving.

TOPICS COVERED

- Techniques for Improving Creative Abilities
- Idea-Generation Techniques
- Brainstorming Techniques

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Fogler & LeBlanc • Chapter 5, pp. 89-109 • Chapter 6, pp. 111-138 • Chapter 11, pp. 246-259	No	6 hr
Lesson: Study the lesson for this module.	No	2 hr
Analysis 1: Submit the analysis titled “Improving Creative Abilities.”	Yes	2 hr
Analysis 2: Submit the analysis titled “Idea Generation Techniques.”	Yes	2 hr
Exercise: Submit the exercise titled “Brainstorming.”	Yes	1 hr
Project: Submit Project Part 1.	Yes	2 hr
Project: Start work on Project Part 2.	No	2 hr

Total Out-Of-Class Activities: 17 Hours

MODULE 5: PROBLEM ANALYSIS

COURSE LEARNING OBJECTIVES COVERED

- Apply mathematics as a problem solving tool.
- Provide symbolic, verbal, and graphical interpretations of statements in a problem description.
- Apply analytical tools for evaluating the causes and potential implications of a problem.
- Design methodology for implementing problem solution(s).
- Develop tools for evaluating implementation of problem solution(s).

TOPICS COVERED

- Techniques for Preventing Potential Problems
- Reading Bar Graphs and Line Graphs
- Comparing Project Management Tools
- Using Gantt Charts

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Fogler & LeBlanc • Chapter 7, pp. 139–172 • Chapter 8, pp. 173–191	No	5.5 hr
Lesson: Study the lesson for this module.	No	2 hr
Discussion: Participate in the discussion titled "Comparing Project Management Tools."	Yes	1 hr
Analysis: Submit the analysis titled "Potential Problem Analysis."	Yes	2 hr
Exercise 1: Submit the exercise titled "Reading Bar Graphs and Line Graphs."	Yes	2 hr
Exercise 2: Submit the exercise titled "Developing a Gantt Chart."	Yes	1 hr
Project: Continue to work on Project Part 2.	No	2 hr

Total Out-Of-Class Activities: 15.5 Hours

MODULE 6: PROBLEM EVALUATION

COURSE LEARNING OBJECTIVES COVERED

- Execute problem solving actions appropriate to completing a variety of case study assignments.
- Apply critical reading to identify the meaning of information in a problem statement.
- Apply analytical and logical thinking to extract facts from a problem description and determine how they relate to one another and to the problem(s) to be solved.
- Apply mathematics as a problem solving tool.
- Provide symbolic, verbal, and graphical interpretations of statements in a problem description.
- Apply analytical tools for evaluating the causes and potential implications of a problem.
- Generate potential solutions to a problem and determine the best course of action with regard to effectiveness, efficiency, and mitigation of risks.
- Design methodology for implementing problem solution(s).
- Develop tools for evaluating implementation of problem solution(s).
- Use the ITT Tech Virtual Library to research selected topics related to problem solving.

TOPICS COVERED

- Putting It All Together
- Using Evaluation Techniques

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Folger & LeBlanc • Chapter 9, pp. 193-212 • Chapter 11, pp. 235-262 • Chapter 10, pp. 213-233	No	8 hr
Lesson: Study the lesson for this module.	No	1 hr
Exercise: Submit the exercise titled "Putting It All Together."	Yes	2 hr
Analysis: Submit the analysis titled "Using Evaluation Techniques."	Yes	2 hr
Project: Submit Project Part 2.	Yes	2 hr

Total Out-Of-Class Activities: 15 Hours

EVALUATION AND GRADING

EVALUATION CRITERIA

The graded assignments will be evaluated using the following weighted categories:

CATEGORY	WEIGHT
Analysis	30%
Discussion	15%
Exercise	25%
Project	30%
TOTAL	100%

GRADE CONVERSION

The final grades will be calculated from the percentages earned in the course, as follows:

GRADE		PERCENTAGE
A	(4.0)	90–100%
B+	(3.5)	85–89%
B	(3.0)	80–84%
C+	(2.5)	75–79%
C	(2.0)	70–74%
D+	(1.5)	65–69%
D	(1.0)	60–64%
F	(0.0)	<60%

LEARNING MATERIALS AND REFERENCES

REQUIRED RESOURCES

COMPLETE TEXTBOOK PACKAGE

- Fogler, H.S. and LeBlanc, S.E. (2008). *Strategies for creative problem solving (Custom* ed.). Upper Saddle River, NJ: Pearson.
- William S. Addison Wesley Higher Education. (2008). *Mathematics in action concept videos CD (Custom 1st ed.). Boston, MA: Pearson.*

RECOMMENDED RESOURCES

Log on to the ITT Tech Virtual Library at http://library.itt-tech.edu/ to access online books, journals, and other reference resources selected to support ITT Tech curricula.

- Books and Professional Journals

  You may search on the home page to find the following books using “Basic Search”:
  - Shea, Virginia. *Netiquette. Online ed. 1.1. San Francisco, CA: Albion Books, 1994-2000.*
  - Ebrary
    - Rowland, Robin. *Creative Guide to Research: How to Find What You Need... Online or Offline. Franklin Lakes, NJ, USA: Career Press, Incorporated, 2000.*
    - Sanders, Ralph. *Executive Decision Making Process: Identifying Problems & Assessing Outcomes. Westport, CT, USA: Greenwood Publishing Group, Incorporated, 1999.*

INSTRUCTIONAL METHODS AND TEACHING STRATEGIES

The curriculum employs a variety of instructional methods that support the course objectives while fostering higher cognitive skills. These methods are designed to encourage and engage you in the learning process in order to maximize learning opportunities. The instructional methods include but are not limited to lectures, collaborative learning options, use of technology, and hands-on activities.

To implement the above-mentioned instructional methods, this course walks through the five-step problem solving process, focusing on covering one step—and at times, two steps—in each module. The course provides you exposure to some basic math concepts to help you prepare for future courses that include problem analysis and mathematical applications. The strategy is to cover one or more basic math concepts in each module except Module 1. Wherever possible, the course will focus on application of math in solving everyday problems. Your progress will be regularly assessed through a variety of assessment tools including Analysis, Discussion, Exercise, and Project.

OUT-OF-CLASS WORK

For purposes of defining an academic credit hour for Title IV funding purposes, ITT Technical Institute considers a quarter credit hour to be the equivalent of: (a) at least 10 clock hours of classroom activities and at least 20 clock hours of outside preparation; (b) at least 20 clock hours of laboratory activities; or (c) at least 30 clock hours of externship, practicum or clinical activities. ITT Technical Institute utilizes a “time-based option” for establishing out-of-class activities which would equate to two hours of out-of-class activities for every one hour of classroom time. The procedure for determining credit hours for Title IV funding purposes is to divide the total number of classroom, laboratory, externship, practicum and clinical hours by the conversion ratios specified above. A clock hour is 50 minutes.

A credit hour is an artificial measurement of the amount of learning that can occur in a program course based on a specified amount of time spent on class activities and student preparation during the program course. In conformity with commonly accepted practice in higher education, ITT Technical Institute has institutionally established and determined that credit hours awarded for coursework in this program course (including out-of-class assignments and learning activities described in the “Course Outline” section of this syllabus) are in accordance with the time-based option for awarding academic credit described in the immediately preceding paragraph.

ACADEMIC INTEGRITY

All students must comply with the policies that regulate all forms of academic dishonesty or academic misconduct. For more information on the academic honesty policies, refer to the Student Handbook and the School Catalog.

INSTRUCTOR DETAILS

Instructor Name	
Office Hours	
Contact Details	

(End of Syllabus)